RIVERSIDE OXBOW
FORT WORTH, TEXAS

CHAPTER 3
IDENTIFICATION OF PROBLEMS AND OPPORTUNITIES

Regular study team meetings were held with the Tarrant Regional Water District, the USFWS, Streams and Valleys, Inc., the city of Fort Worth, GideonToal (under contract to the TRWD), USFWS, and a multidisciplinary water resources team from the U.S. Army Corps of Engineers, Fort Worth District to discuss and define problems and opportunities and to determine potential initiatives for flood damage reduction, ecosystem restoration, and recreation within the study area. Field surveys conducted to document the existing conditions of the natural resources within the study area were also utilized to identify specific resource needs and any constraints that might limit the implementation and future viability of potential ecosystem restoration measures. Comments and recommendations from the resource specialists were incorporated into a number of possible restoration measures appropriate to the habitat type, site location and existing conditions.

Flood Damage Reduction Problems and Opportunities. As noted in Chapter 2 under the Economic Analysis section, the Riverside Oxbow study area does not contain any damageable structures within the 100-year and SPF floodplains, therefore, the study team decided to limit any further investigation of flood damage reduction opportunities to those that might be incidental to... "environmental enhancement, water quality, recreation, and other allied purposes," as stated in the authorizing language for this study.

Ecosystem Restoration Problems and Opportunities. The Riverside Oxbow and surrounding area has experienced both direct and indirect environmental degradation as a result of the construction and implementation of Benbrook Lake, Eagle Mountain Lake, Lake Worth, the Fort Worth Floodway project, and subsequent flood control projects and development activities. According to the USFWS (1985), the indirect downstream effects of large flood control projects and reservoir construction on natural bottomland ecosystems are often more destructive, albeit not as immediate, as the direct impacts. Adverse impacts observed downstream include: 1) an unnatural bottomland hydroperiod causing major vegetational changes toward more xeric species as a result of the reduction in flooding; 2) the reduction of associated nutrient inputs to downstream bottomlands; 3) the loss of aquatic flora and fauna; 4) the loss of bank-stabilizing vegetation as a result of excessive bed and bank scour from irregular reservoir releases; 4) disruption of normal feeding and spawning cycles of fish which use floodplains; 5) elimination of high flows into bottomlands which prevents the input of bottomland nutrients into the aquatic system; and 6) potential negative effects to plant communities as a result of prolonged water releases during the growing season.

Within the state of Texas, it is estimated that more than 63 percent of the historical bottomland hardwoods and bottomland-forested wetlands have been lost due to reservoir construction and operation, agricultural conversion, timber production, channelization, and urban and industrial development (Texas Center for Policy Studies 1995). Numerous studies have documented the increasing scarcity of bottomland hardwood forests in Texas and the nation (Frayer et al. 1983; Fish and Wildlife Service 1985; Frye 1987). In fact, prior to European settlement Texas had approximately 16 million acres of bottomland hardwood riparian habitat. Today the state has less than 5.9 million acres.

It is well known that the floodplain bottomlands along rivers and streams in the Upper Trinity River Basin at one time made up the vast majority of the forested land cover in the region. Trend analyses indicate that there has been a significant loss of forested lands and a marked corresponding increase in the acres of managed grasslands in the Upper Trinity River Basin. These analyses, included in the Final Programmatic Environmental Impact Statement for the Upper Trinity River Basin, dated June 2000, indicate between 1984 and 1995, there has been an approximate 14.4 percent loss of forested land cover. Also indicated was a corresponding 13.6 percent increase in managed grasslands in the Upper Trinity River Basin, which encompasses the Riverside Oxbow study area.

The impoundment and operation of Benbrook Lake on the Clear Fork, Eagle Mountain Lake and Lake Worth on the West Fork have not only destroyed bottomland hardwoods and their associated wetlands, but have also caused the loss and degradation of the tall grass prairies which historically made up the major component of the landscapes in this region of Texas (Fort Worth Prairie component of the Grand Prairie within the Cross Timbers and Prairies ecoregion). In presettlement times, woodlands were only found as narrow ribbons of bottomland stands along the major watercourses, as scattered mottes in the prairie grasslands or associated with draws and drainages of upland mesas and buttes. The vast majority of these grasslands have been altered by grazing, agricultural development and urban development activities and no longer support the habitat quality and diversity of the original prairie associations. Prior to settlement, there were 12 million acres of prairie in Texas extending from San Antonio to the Oklahoma border. According to the Texas Environmental Almanac (1995), today, less than 1-percent of these prairie lands remain.

Aquatic resources within the study area include the West Fork of the Trinity River and small ephemeral wetlands and ponds. All of these bodies of water have been modified and encroached upon by urbanization, flood control projects and agriculture activities. Specific impacts of these types of activities on the aquatic fauna and flora in the study area include: 1) a reduction in the benthos production as a result of less food and habitat in and along the river; 2) reduction of cover, spawning and nursery habitat for fish; 3) disruption of fish territory and migration patterns; 4) reduction in plankton production; and 5) a redistribution and reduction of organic matter.

The operation of the reservoirs has also had an adverse impact on water quality. The reduction in downstream flooding has increased the amount of land available for agricultural production and urban development. In addition to the clearing of

bottomland and floodplain forests for agricultural land and urban development, activities such as plowing, clearing, grading and/or grazing disturb the soil, thereby affecting the survival of invertebrates. These activities have also cause erosion problems and increased the rates of sedimentation. In turn, the quality of the water is adversely impacted by these and various other upland activities, including fertilizer, pesticide and herbicide applications on agricultural fields and lawns, waste water treatment processing and point- and non-point source pollution from local runoff. At the outset of this study, the Tarrant Regional Water District, as the local sponsor for this study and a major water supply entity in the region, expressed interest in improving and protecting water quality within the study area.

The modifications of the natural habitat of the floodplains of the Upper Trinity River and major tributaries, as described above, have subsequently impacted the aquatic and terrestrial wildlife species utilizing the ecosystem. By itself, any of these impacts would cause some degree of degradation to the aquatic and bottomland hardwood habitat downstream; when combined, the significance of the degradation to the quantity and quality of the downstream habitat becomes increasingly significant. According to the Texas Environmental Almanac (1995), the overwhelming loss of and threats to wildlife, plants and natural communities are a direct result of habitat alteration and destruction. The study team recognized the loss and alteration of habitat quality and quantity as a major concern within the study area.

Based upon on-site investigations conducted during feasibility level studies on the Riverside Oxbow area, the following problems were observed that limit environmental quality of the area. The channelized segment of the currently carries all flows associated with the West Fork. Flows only occur in the oxbow from localized runoffs. Occasional backwater from the West Fork inundates the segment extending upstream to Beach Street but, even then, an 84-inch diameter wastewater pipeline that crosses the oxbow at the downstream confluence with the West Fork inhibits fisheries use of the oxbow channel. The Beach Street crossing of the oxbow also blocks backwater movement and limits use of the oxbow for spawning, rearing and general sanctuary for fish that need to escape the high velocities that occur in the main channel during prolonged flood events and operational releases.

The construction techniques used at the Beach Street crossing limits the ability of non-avian wildlife to utilize the riparian corridor. Reconfiguration of this crossing could effectively fully reconnect the 1.2 mile riparian segment along the oxbow channel between Riverside Drive and Beach Street with the West Fork riparian corridor which extends downstream continuously without similar obstructions all the way to the existing Dallas Floodway, a distance of approximately 41.4 river miles.

During the approximately 30-year period since the oxbow was effectively separated from the modified West Fork channel and from the beneficial effects of the river flowing through the channel, several changes have occurred. Sloughing of the bank and sedimentation from other sources has caused a narrowing of the channel to approximately 30 to 40 feet in width. The natural West Fork channel width downstream of this area is

currently in excess of 120 feet. Thick growths of vines and invader trees and shrubs have developed on the first bench of the old channel, limiting habitat quality for terrestrial and aquatic habitats. The invading vegetation has further trapped silt and debris from the flood events resulting in a raised stream bottom. Currently, the Riverside oxbow segment of the West Fork channel is a series of small isolated pools during most of the year.

Because the soils adjacent to the old river channel no longer have a continual source of flowing water to keep them moist, many of the native trees located along the channel have experienced stress, which has inhibited their growth. Some have even died, only to be replaced by non-native invaders that have low value to wildlife. These invaders species include escaped ornamental plants, such as nandina and honeysuckle, and even worse, Chinaberry and naturalized privets of the Ligustrum genus. The Nature Conservancy has identified Ligustrum as a serious invader in this and other natural areas of the Southeast. According to information retrieved from the Nature Conservancy, Internet web site, http://tncweeds.ucdavis.edu/worst/ligustr.html map on August 29, 2002, "*Its (non-native privet) fruit are not particularly good forage, but since large numbers of fruit are produced hungry birds end up eating some of it (especially since the privet probably displaced a native species that would have fed the birds). In this way, privet spreads–rapidly! Every privet plant in the wild is depleting the resources for native wildlife.*"

Within the riparian corridor, including the riparian stringers located south of IH-30, non-native invaders quickly occupy temporary openings on the forest floor caused by natural processes such as death (due to disease or old age), lightning strikes and wind throw. Similar invasion has been observed at sites where erosion caused by man's activities has impacted the native vegetation. Native shrubs, which used to support wildlife, have slowly been replaced through this invasion. Hard mast producers, such as pecans and oaks, are also slowly being replaced in this same manner, usually by Chinaberry trees.

Several small areas of another invader, the Tree-of-heaven, which is native to China, have been noted in an area upstream of the study area. Once established trees like the privet, Chinaberry and the Tree-of-heaven are very hardy, can thrive in a wide variety of soil and climate conditions, have tremendous reproductive capability and, essentially, will out-compete other native vegetation along the riparian corridor. Left in an unmanaged situation, these non-native invaders could ultimately become so widespread along the riparian areas that restoration potential would become severely limited. Active management on a large scale that includes nearby sources of re-infestation would increase the chances for restoration of native shrub and midstory layer plants within the area.

Within portions of the study area outside of the oxbow channel and the immediate riparian corridor, other man-induced changes have occurred that collectively have reduced the environmental quality of the area. The previously mentioned alteration of hydroperiod brought about by the construction of upstream reservoirs, for both flood control and water supply, coupled with the effects of channelized upstream reaches of the West Fork and Clear Fork, have resulted in loss of small emergent wetlands along the

floodplain. Overbank flows within the area, formerly eroded narrow, linear cuts in the floodplain that developed into wetlands. With control of the flooding this does not occur as it once did and, as is part of the natural process of trapping nutrients and sediments, many of the older wetlands have slowly converted back to grasslands and shrublands. The existing cutoff of the old Sycamore Creek, which was created when the modified channel was constructed and the creek was cutoff from flows between the modified channel and the oxbow, is already showing signs of filling and bank sloughing. Only a small portion of the cutoff reach of Sycamore Creek currently contains water for a sufficiently long period each year to retain wetland features.

Within the natural floodplain of the West Fork adjacent to the oxbow and to the natural channel downstream, gravel and topsoil excavations and fills have disturbed and reduced the overall quality of the riparian resources. Land uses currently result in the manicuring of grasslands up to the very edge of the existing resource areas of significance, primarily the wooded areas, and the developed wet areas associated with the excavations.

Habitat evaluations conducted during the course of the feasibility strongly reflected the result of the forces of many past actions and continuing operational measures on the environment within the Riverside Oxbow study area. Wetland and grassland values were found to be unusually low for the Upper Trinity Basin. Forested areas were also low compared to other sites located in other areas of the Upper Trinity Basin.

Recreation Problems and Opportunities. TRWD, their contractor, GideonToal, and Streams and Valleys, Inc. conducted several public meetings in the summer of 2000 to solicit input from local neighborhoods and citizens about their interests and concerns for the Clear Fork and West Fork and tributaries throughout Fort Worth. The meetings were well attended by citizens and special interest groups who use the existing Trinity trails or the river for recreation activities and/or who are interested and concerned for the natural resources within the floodplain. Based on these meetings, an area of concern identified was the lack of continuity and access to trails along the Trinity River and the need for additional water- and land-based recreation experiences along and within the river to accommodate a wide variety of public interests, including hiking, biking, bird watching, canoeing, kayaking, fishing, horseback riding, etc.